

Appendix C: Analysis of SF₆ Concentration Data for Test 2

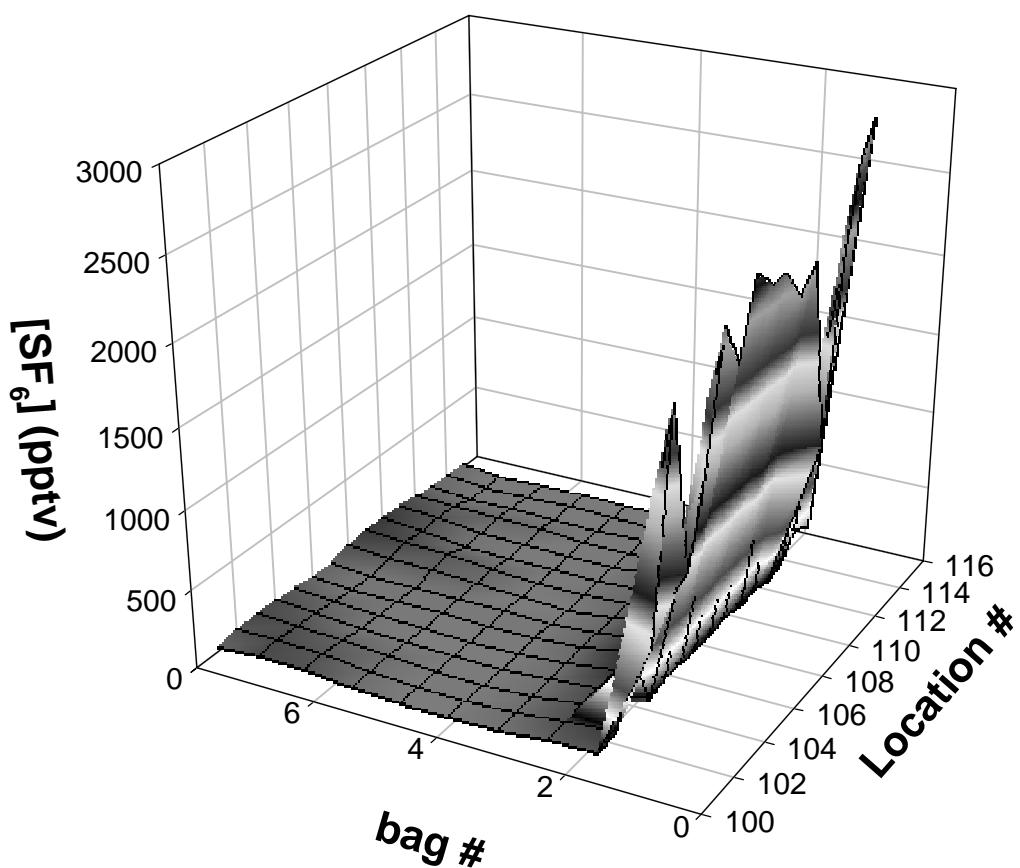


Figure C1. Whole air sampler data for Test 2, Line 1.

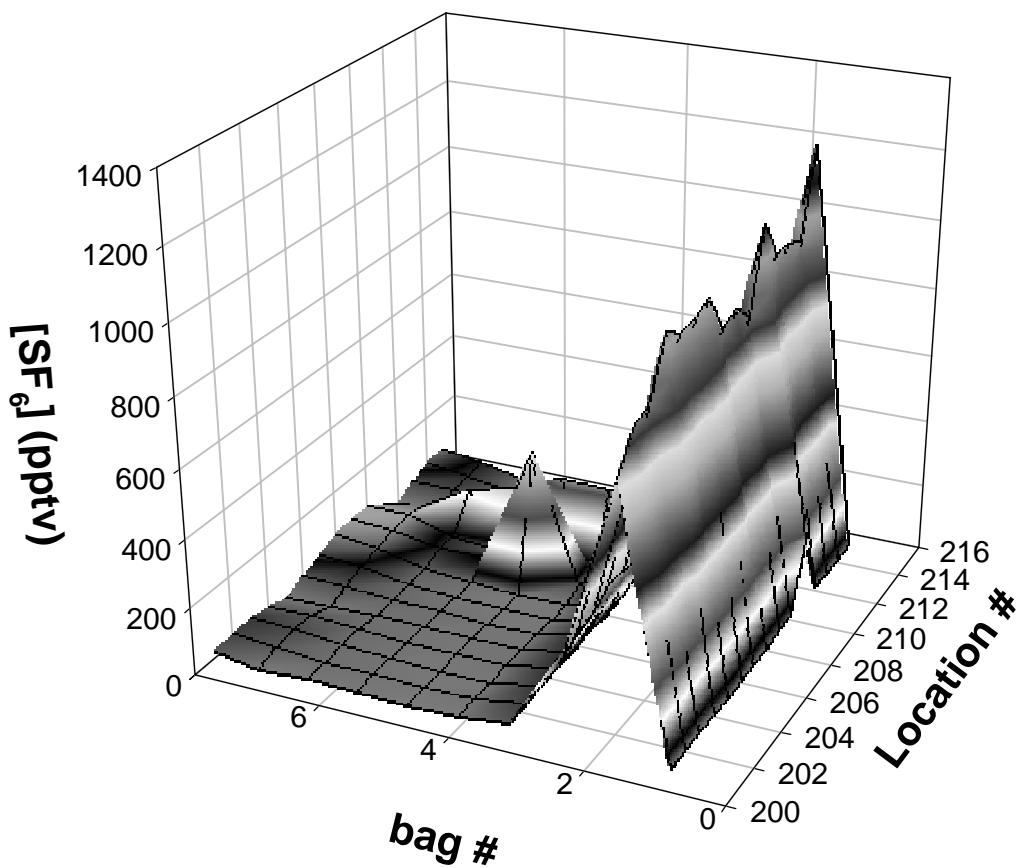


Figure C2. Whole air sampler data for Test 2, Line 2.

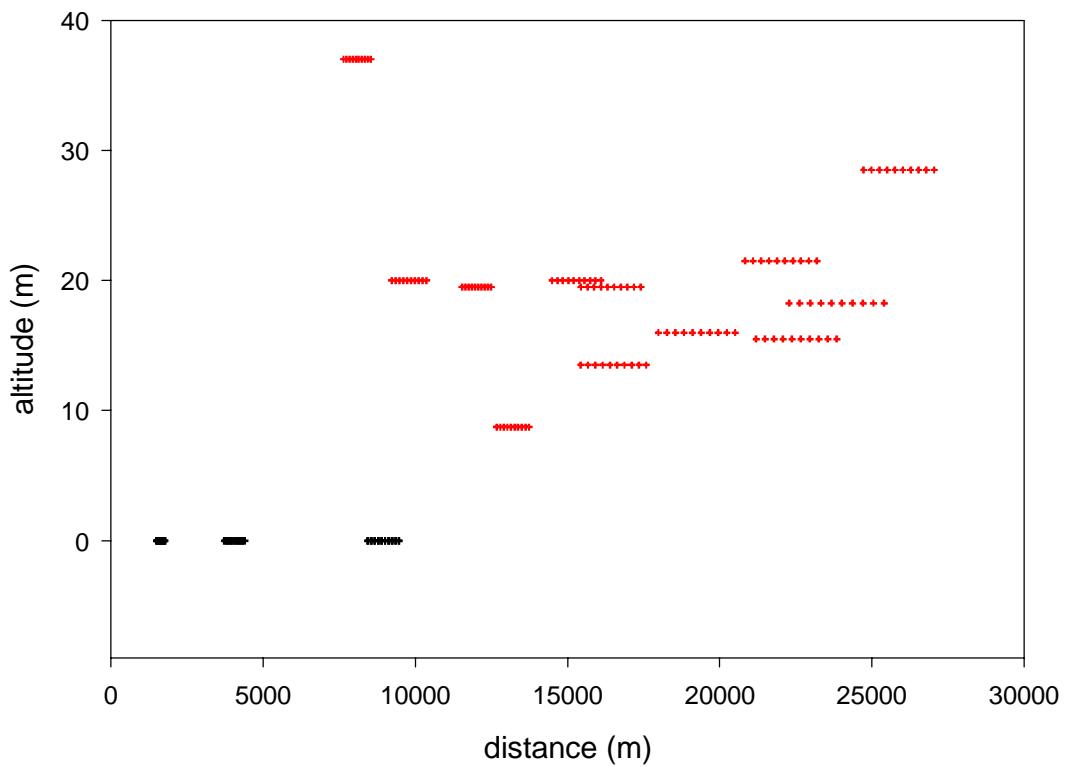


Figure C3. Test 2 continuous analyzer data. Altitude versus downwind distance. The red crosses are aircraft measurements. The black crosses are ground measurements at sampling Lines 1, 2 and 3. The width is $\pm 1\sigma$ from the position of peak concentration.

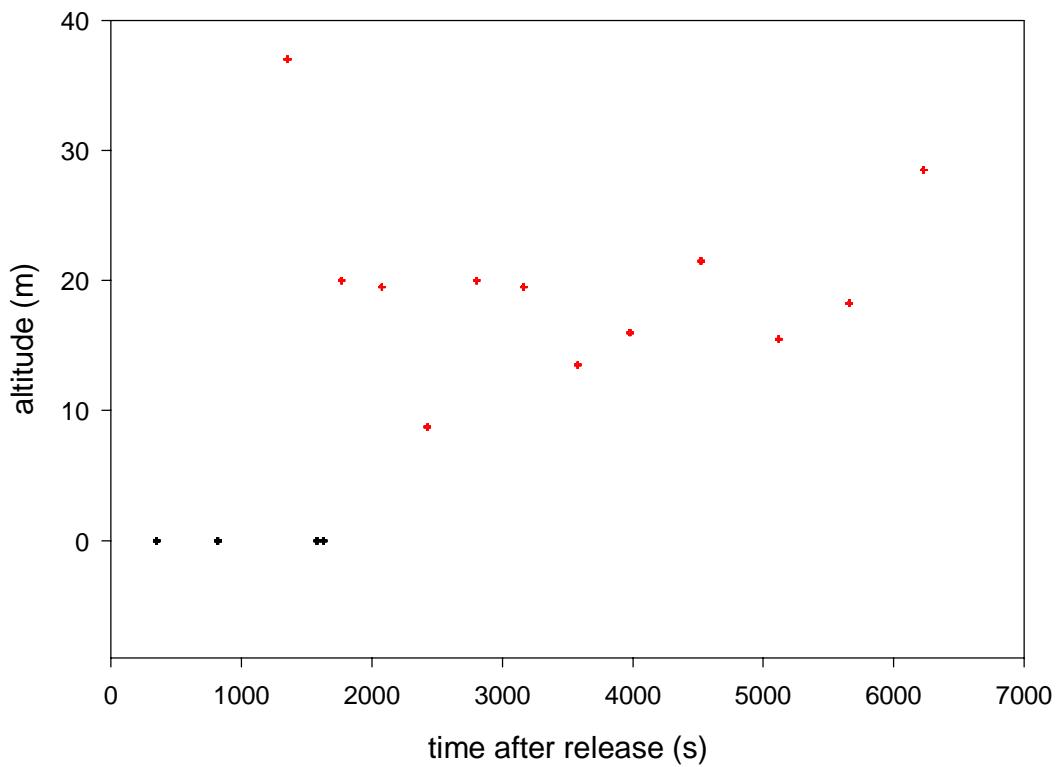


Figure C4. Test 2 continuous analyzer data. Altitude versus time after release. The red crosses are aircraft measurements. The black crosses are ground measurements at sampling Lines 1, 2 and 3.

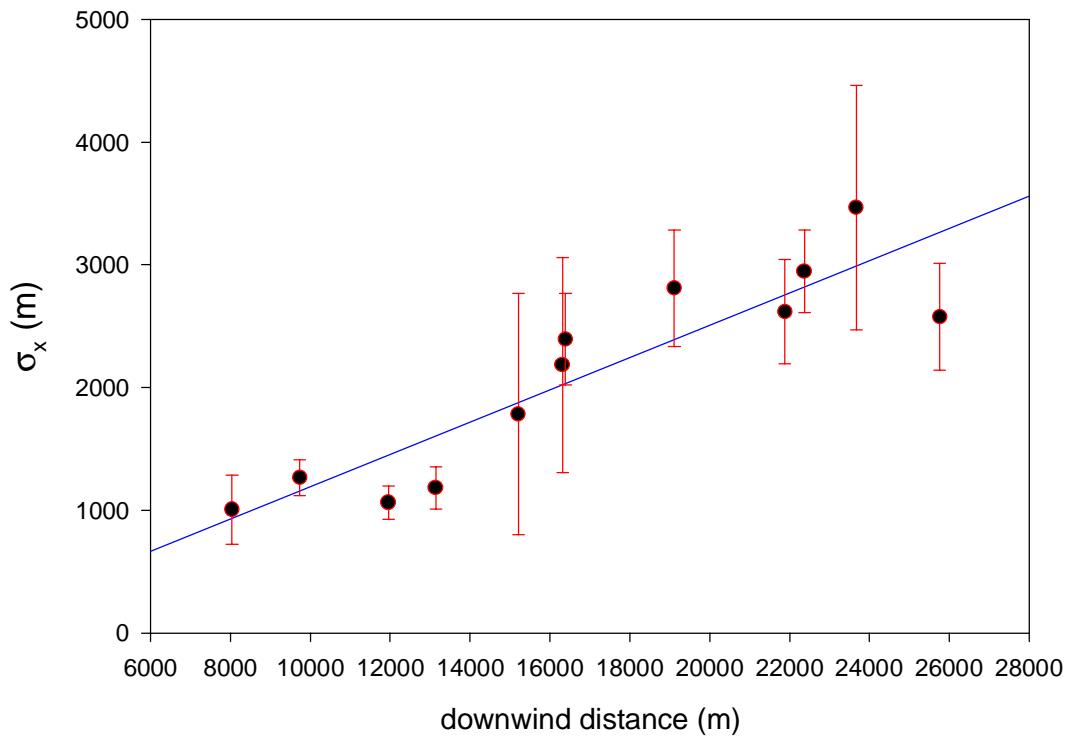


Figure C5. Test 2 σ_x versus downwind distance from aircraft continuous analyzer measurements. The blue line is a linear fit to the data with the equation $\sigma_x = (0.13 \pm 0.02) x + (130 \pm 40)$, $r^2 = 0.8$.

Table C1. Test 2 sampling line SF₆ concentration variability.

ID	WS (m s ⁻¹)	σ_{ws} (m s ⁻¹)	θ (deg)	σ_θ (deg)	mrsd	σ_{mrsd}	N
Line 100	3.2	0.5	142	4	0.9	0.5	6
Line 200	3.1	0.5	141	5	2.2	0.9	12
Line 300	2.9	0.5	140	6	0.8	0.6	12
All					1.3	0.9	36
0 - 100 pptv					1.4	0.8	32
100 - 500 pptv							
> 500 pptv					0.9	1.4	4

Table C2. Test 2 sampling line SF₆ concentration variability by line for each sampling bag.

Bag	Line 100				Line 200				Line 300			
	Mean SF ₆ (pptv)	σ_{SF_6} (pptv)	rsd	Bag	Mean SF ₆ (pptv)	σ_{SF_6} (pptv)	rsd	Bag	Mean SF ₆ (pptv)	σ_{SF_6} (pptv)	rsd	
1	1838	879	0.5	1	21	51	2.4	1	401	40	0.1	
2	39	39	1.0	2	1011	114	0.1	2	5	2	0.4	
3	7	3	0.5	3	28	70	2.5	3	5	2	0.4	
4	6	3	0.5	4	21	59	2.8	4	4	2	0.5	
5	5	2	0.4	5	47	117	2.5	5	5	2	0.4	
6	8	12	1.5	6	18	47	2.6	6	5	2	0.4	
7	15	21	1.3	7	6	5	0.9	7	4	2	0.5	
8				8	22	61	2.8	8	3	3	1.0	
9				9	21	59	2.7	9	4	6	1.0	
10				10	23	53	2.3	10	7	12	1.0	
11				11	69	153	2.2	11	2	4	1.0	
12				12	443	1310	3.0	12	9	17	2.0	

Table C3. Test 2 SF₆ transport parameters from ground-based continuous analyzers.

	Location					
	101	115	201	215	301	315
WS (m s ⁻¹)	3.2		3.1		2.9	
σ_{ws} (m s ⁻¹)	0.5		0.5		0.5	
θ (deg)		142		141		140
σ_θ (deg)		4		5		6
V _{SF₆} (m s ⁻¹)	4.6	4.6	5.2	4.9	5.4	5.6
Error Limit V _{SF₆} (m s ⁻¹)	1.2	1.2	0.4	0.3	0.1	0.1
σ_x (m)	290	320	750	620	1150	1120
Error Limit σ_x (m)	80	90	400	60	90	90
SF ₆ Transport Time (s)	350	350	770	820	1630	1580
Error Limit SF ₆ Transport Time (s)	95	95	60	60	40	40
SF ₆ Peak (pptv)	10700	16800	2100	3100	1000	700
Error Limit SF ₆ Peak (pptv)	530	1400	730	210	70	50

Table C4. Test 2 SF₆ transport parameters from aircraft continuous analyzer.

	Pass							
	1	2	3	4	5	6	7	8
SF ₆ Speed (m s ⁻¹)	5.9	5.5	5.7	5.4	5.4	5.1	4.5	4.8
Error SF ₆ Speed (m s ⁻¹)	0.20	0.04	0.01	0.01	0.10	0.08	0.04	0.03
σ_x (m)	1000	1270	1060	1180	1780	2180	2400	2800
Error σ_x (m)	280	150	130	170	980	880	370	480
Peak Detection Time (s)	1350	1770	2080	2430	2800	3170	3580	3980
Error Peak Detection Time (s)	15	14	14	14	16	15	31	15
Peak Concentration (pptv)	870	760	560	400	280	250	240	260
Error Peak Concentration (pptv)	200	40	40	40	110	70	30	40
Altitude (m)	40	20	20	10	20	20	10	20
Downwind Distance (m)	8000	9700	12000	13100	15200	16300	16400	19100
Error Downwind Distance (m)	300	100	30	40	500	300	1700	100

Table C4. Test 2 SF₆ transport parameters from aircraft continuous analyzer (continued).

	Pass							
	9	10	11	12	13	14	15	16
SF ₆ Speed (m s ⁻¹)	4.8	4.3	4.1	4.1				
Error SF ₆ Speed (m s ⁻¹)	0.04	0.01	0.04	0.20				
σ_x (m)	2620	2950	3470	2580				
Error σ_x (m)	430	340	1000	440				
Peak Detection Time (s)	4520	5120	5660	6230				
Error Peak Detection Time (s)	15	14	15	26				
Peak Concentration (pptv)	170	240	170	100				
Error Peak Concentration (pptv)	20	10	40	10				
Altitude (m)	20	20	20	30				
Downwind Distance (m)	21900	22400	23700	25800				
Error Downwind Distance (m)	200	70	200	1600				